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Background-Based Sediment Cleanup Considerations SMS Sediment Workgroup

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"Background" Terminology - MTCA

- Natural Background (existing MTCA term)
  - Not influenced by localized human activities; due to global distributions
- Regional Background (potentially new concept)
  - Due to widespread hydrodynamic influences from uncontrollable sources; away from point sources and PLPs; not technically feasible to dredge or cap
- Area Background (existing MTCA term)
  - Levels consistently present in vicinity of Site due to human activities unrelated to Site releases; interim action and restoration time frame implications

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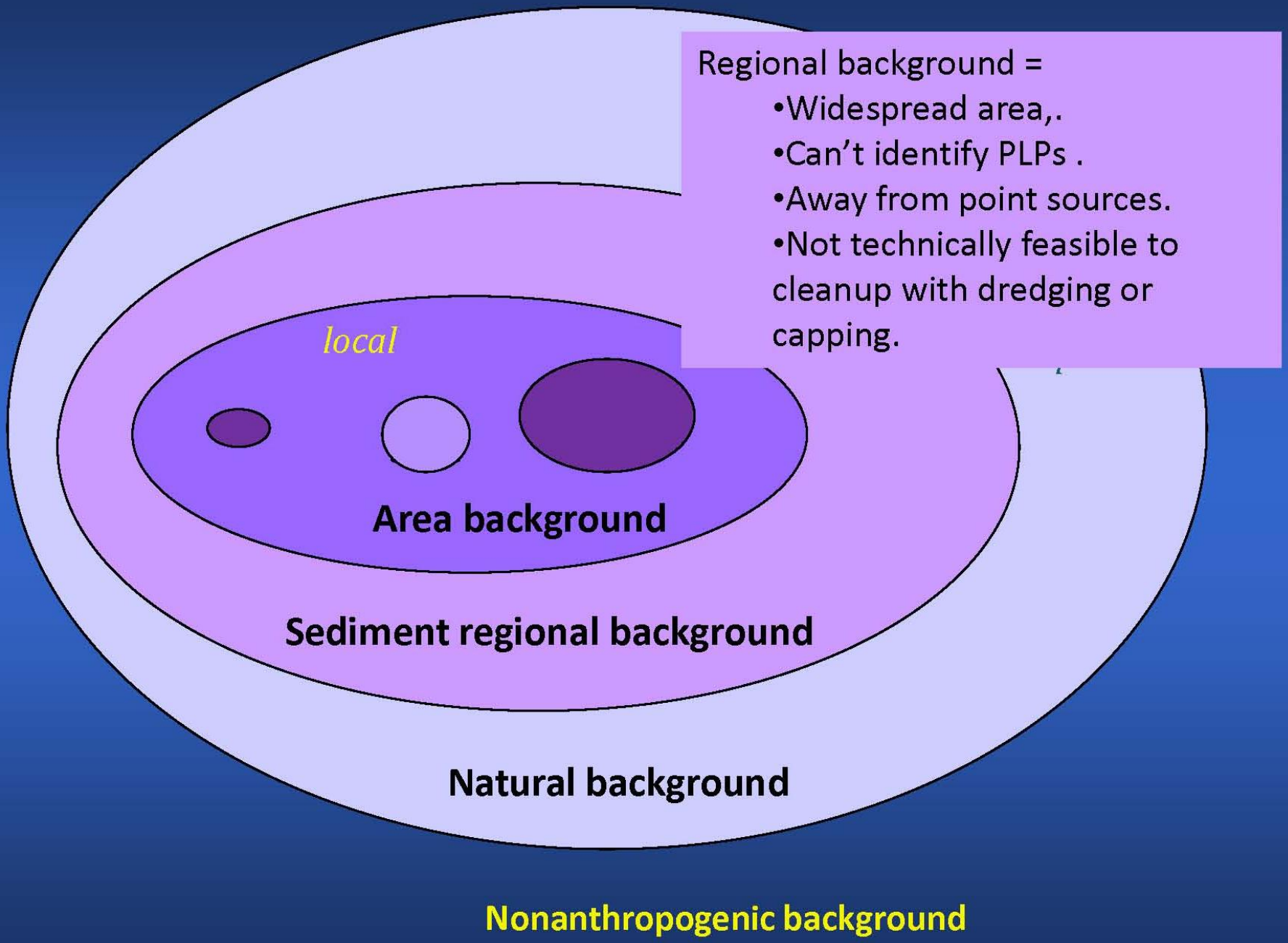
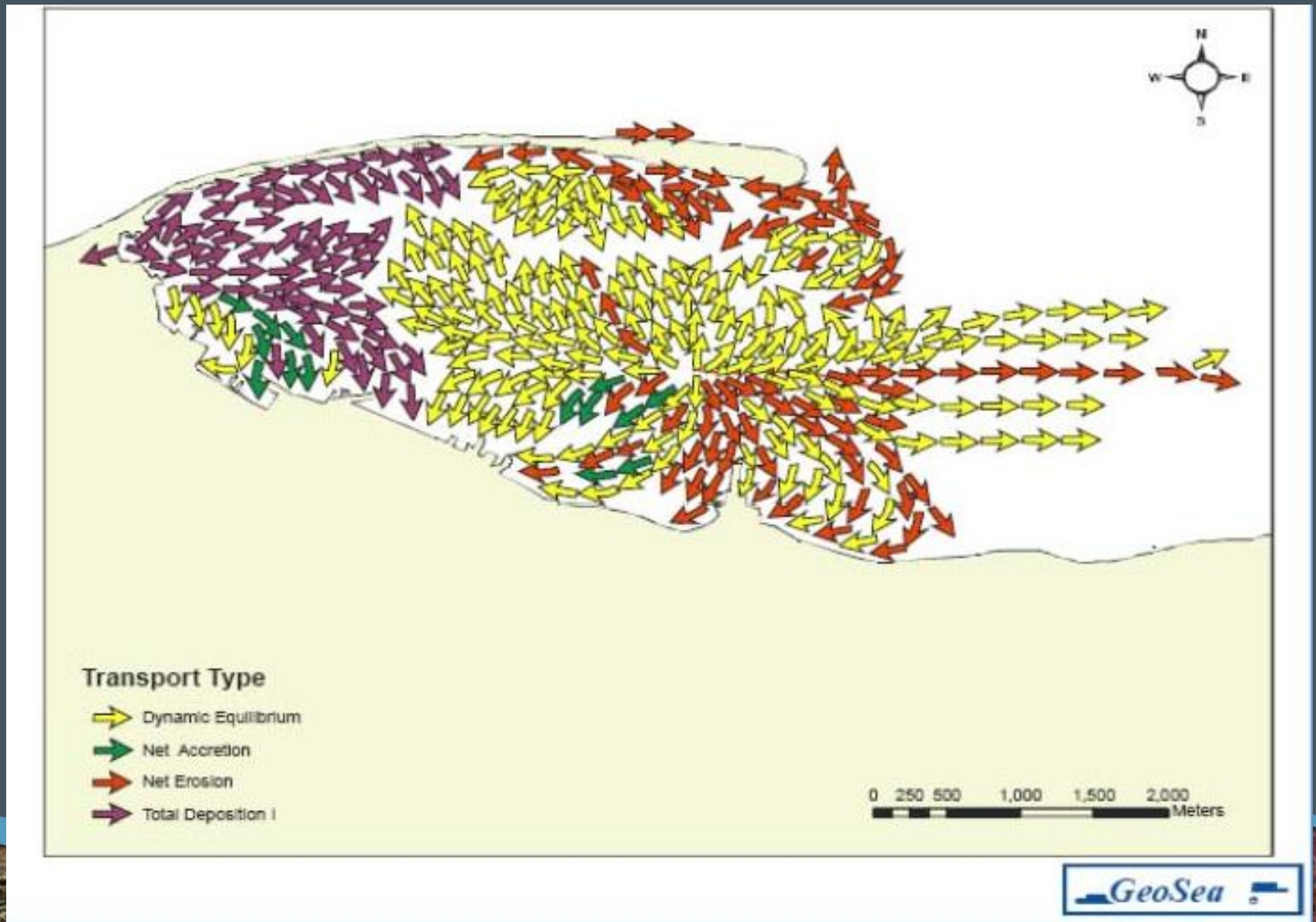

Regional background =
•Widespread area,.
•Can't identify PLPs .
•Away from point sources.
•Not technically feasible to cleanup with dredging or capping.
local
Area background
Sediment regional background
Natural background
Nonanthropogenic background

Other State Sediment Programs

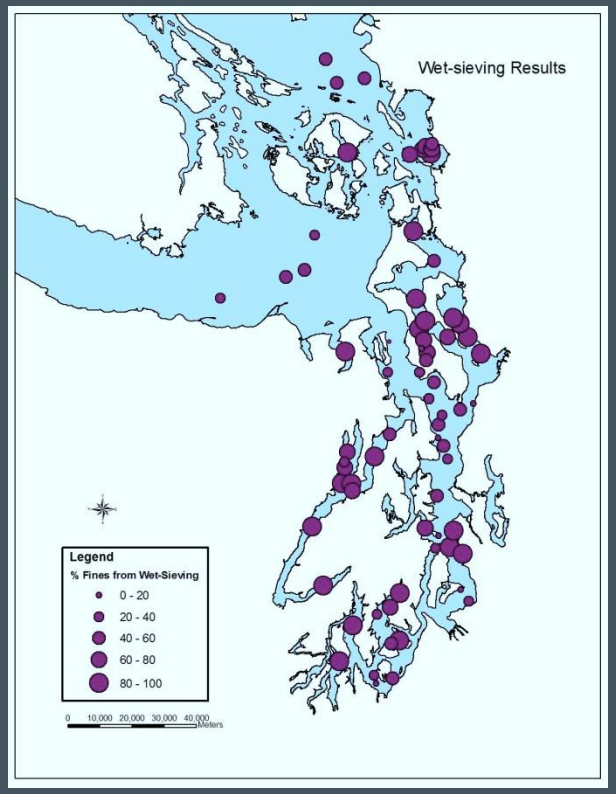
- Massachusetts Contingency Plan Example
  - ***Background*** - levels that would exist in the absence of the site that are ubiquitous and consistently present in the vicinity of the site and attributable to geologic or ecological conditions, or atmospheric deposition of industrial process or engine emissions
  - ***Local Conditions*** – levels found consistently and uniformly throughout the surface water body resulting from permitted discharges and non-point sources (excl. localized sediment contamination)

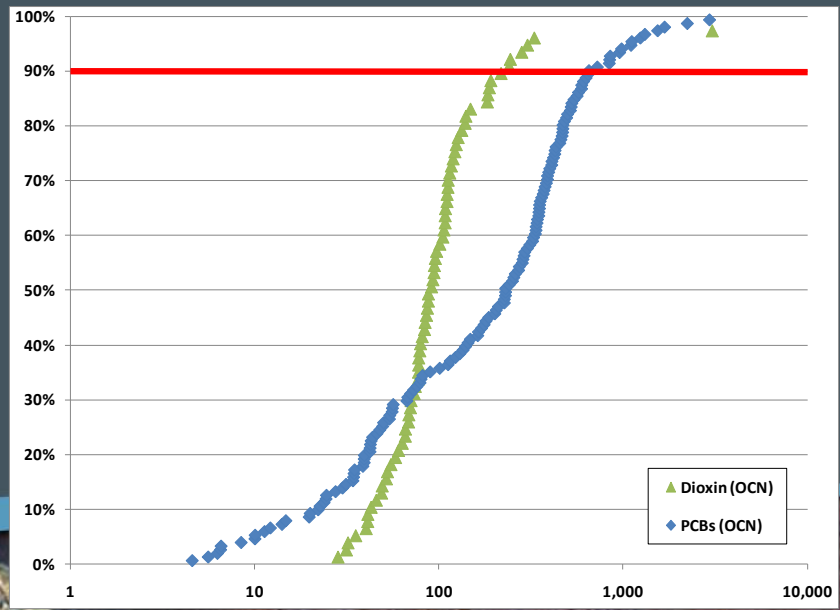
Hydrodynamics and Sediment Transport: Port Angeles Harbor Example



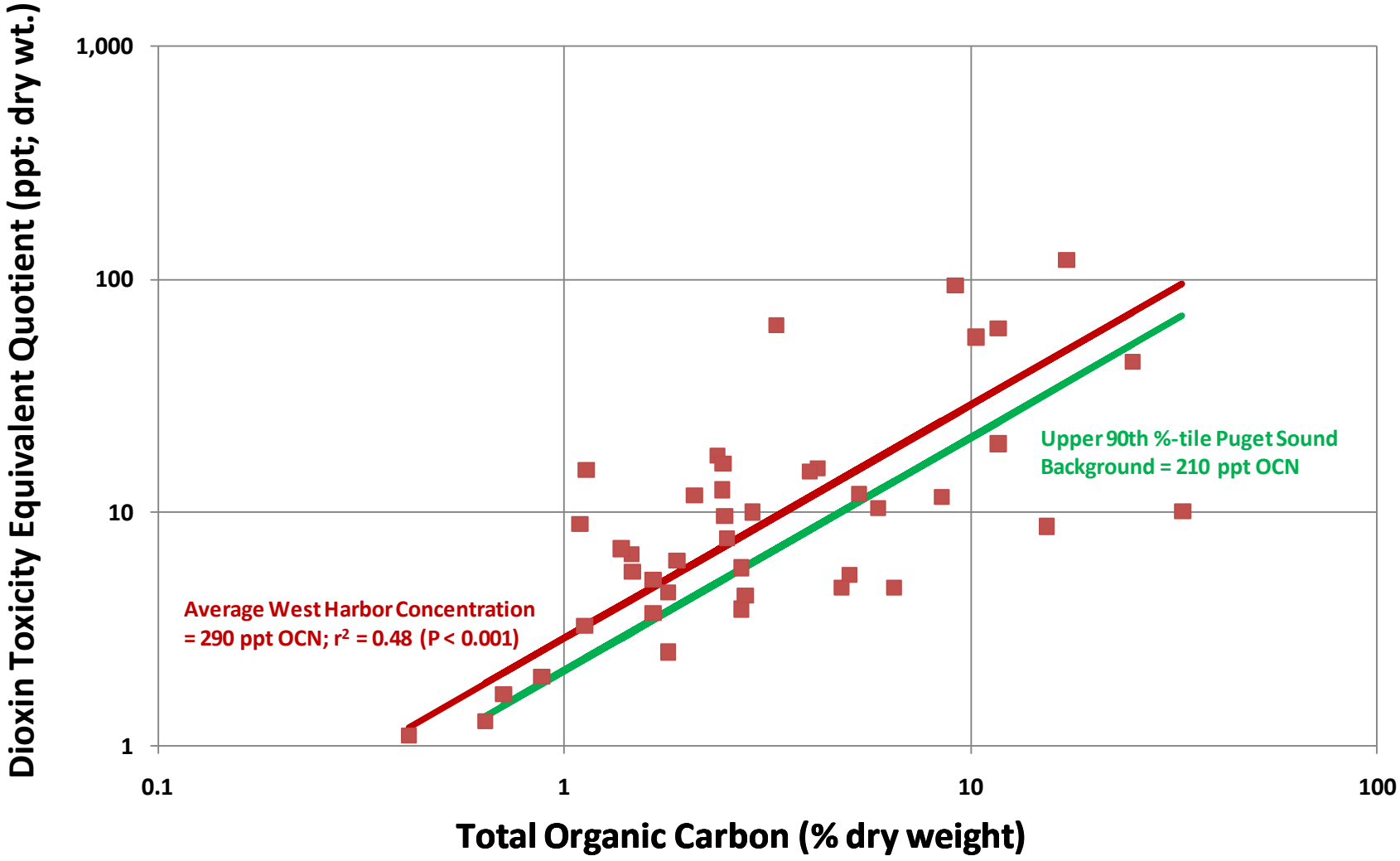
OSV *Bold* 2008 Survey Data

- 75 surface sediment samples
  - Established Puget Sound reference sites and areas away from sources
  - TOC & high res. dioxin/PCB analyses
- Upper 90th %-tile levels (MTCA):
  - Dioxin TEQ = **210 ng/kg** OC (~3 ppt dry wt; ND = ½ DL)
  - PCBs (combined Aroclor & congener) = **650 µg/kg** OC (~7 ppb dry wt; ND = ½ DL)





Surface Sediment TOC versus Dioxin TEQ Concentrations
Ecology 2008 West Port Angeles Harbor Data



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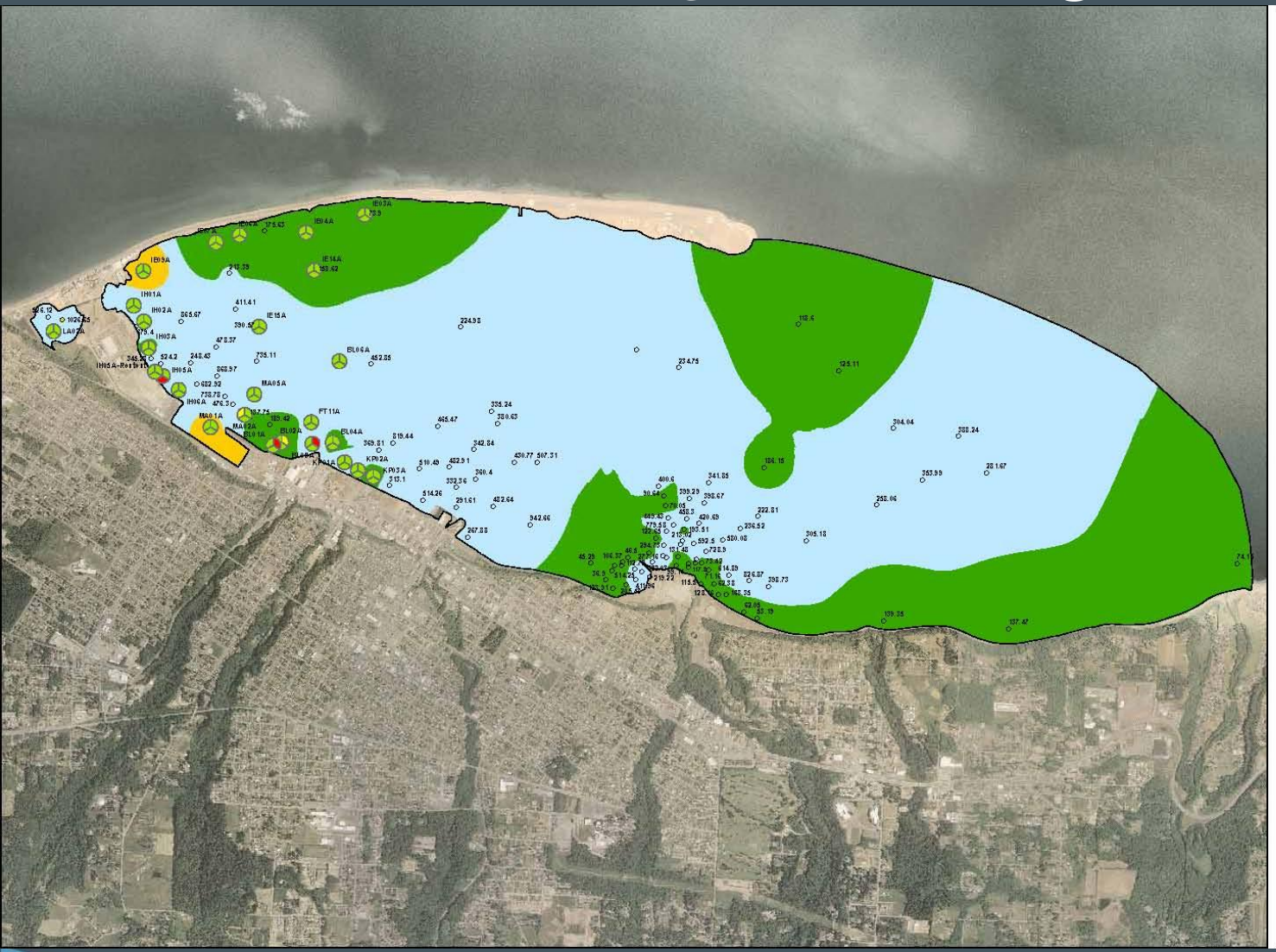
Dioxin/Furan TEQ – Port Angeles Harbor



Bioassay

PG LD AM

LD: Larval Development
AM: Amphipid
PG: Juvenile Polychaete Growth

- Pass
- Fail SQS
- Fail CSL
- Sediment Sampling Location

Total Dioxin/Furan TEQ (Mammal) - OCN (ppt)

- < 210 [Puget Sound Background]
- ≥ 210 - 1,000 [1 to 5x Background]
- ≥ 1,000 - 3,000
- > 3,000

Feet
0 2,525 5,050

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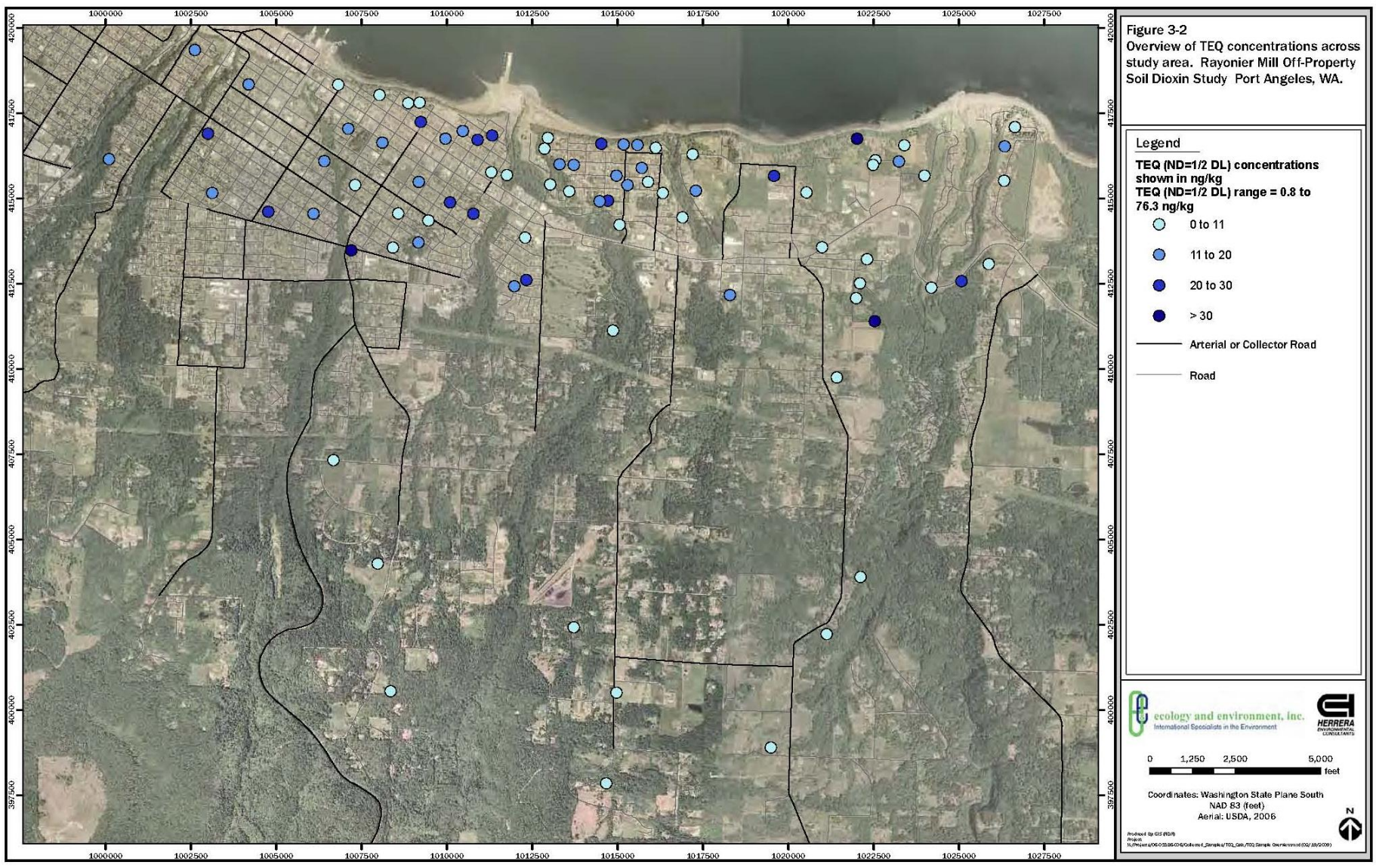
Dioxin/Furan TEQ – Diffuse Urban Sources



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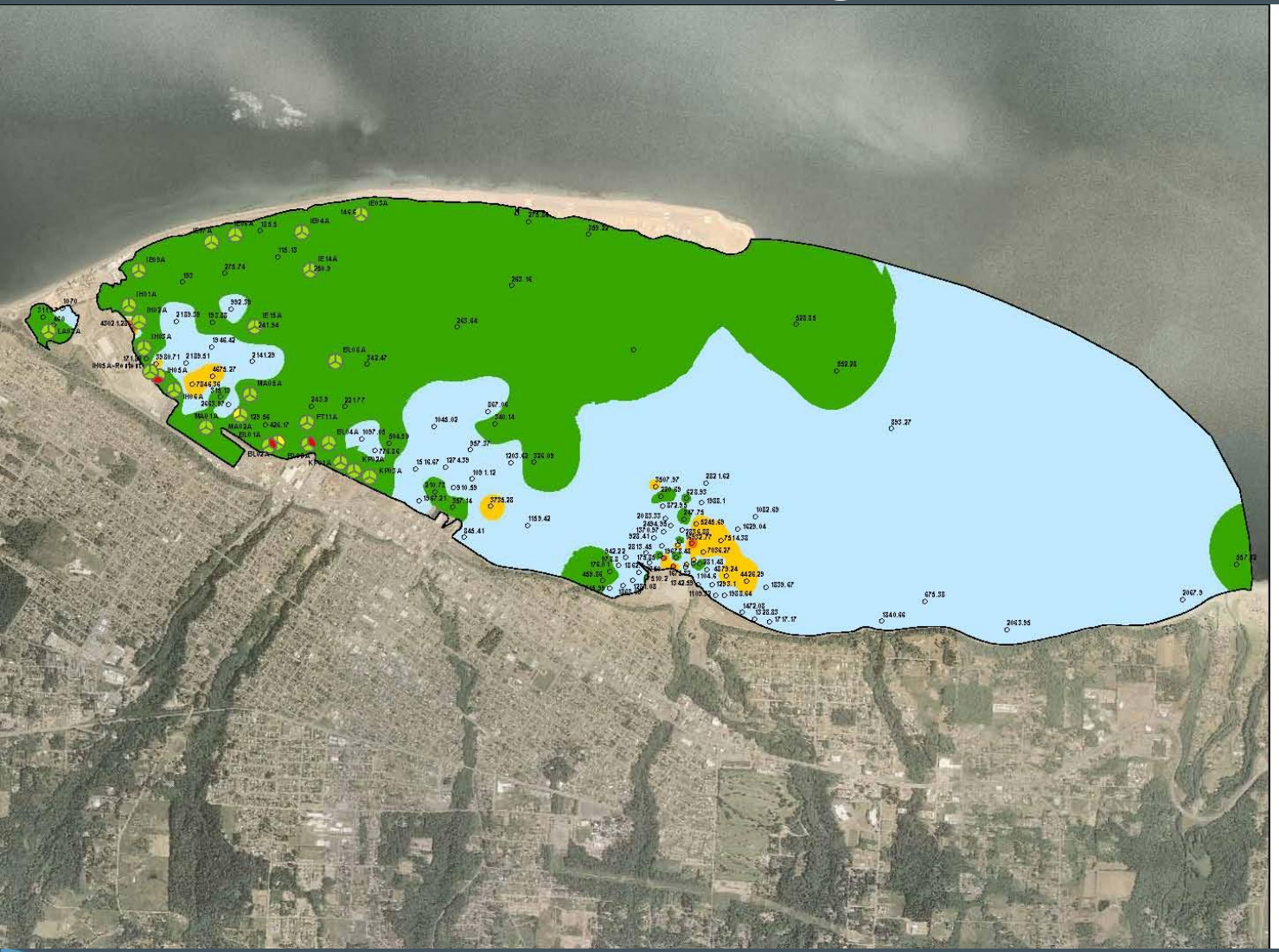
Total PCBs – Port Angeles Harbor



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San Francisco Bay PCB TMDL Approach

- TMDL goal = 10 µg/kg PCBs in tissue (32 gm/day)
- Sediment/tissue levels similar to Puget Sound
- 10-fold reduction in 30 years
- Integrated adaptive mgmt:
  - Phased urban runoff controls
    - 20 year program/$10 billion
  - Nav. dredge disposal in Bay if conc. < 99%-tile of sediments from previous 10 years
  - Site-specific sediment cleanup levels (similar to SMS)
    - Sediment cleanup sites defined as > 180 µg/kg
    - Balance feasibility, practicability, and impacts

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San Francisco Bay PCB TMDL Approach

Table A-1 PCBs Sources and Current Loads to San Francisco Bay

Source Category	PCBs Loads
	Kilograms per year
External	
Direct Atmospheric Deposition	Net Loss
Central Valley Watershed	11
Municipal Wastewater Dischargers	2.3
Industrial Wastewater Dischargers	0.035
Urban and Non Urban-Stormwater Runoff	20
Total	***33[a]***
Internal	
Sediment Dredging and Disposal	Net Loss
Bed Erosion	Not Quantified
In-Bay Contaminated Sediment	Not Quantified

a) Total differs from column sum due to rounding

Table A-2 Load and Wasteload Allocations

Source Category	Allocations
	Kilograms per year
External	
Direct Atmospheric Deposition	0[a]
Central Valley Watershed	5
Municipal Wastewater Dischargers	2
Industrial Wastewater Dischargers	0.035
Stormwater Runoff	2
Stormwater Runoff Treatment by Municipal Wastewater Dischargers	1
Total	***10[b]***

a) Zero allocation reflects overall net loss to the atmosphere

b) Total differs from column sum due to rounding

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SMS Rule Revision Recommendations

- Distinguish between long-term risk-based goals and short-term cleanup action requirements
  - Recognize the importance of source controls and adaptive mgmt. to achieve long-term risk targets
  - Facilitate sediment cleanup to accelerate recovery
- Area background definition under MTCA can be workable for SMS (with consistent policies)
- Rule revisions should clarify expectations for:
  - Setting cleanup levels and restoration time frames that minimize the risk of recontamination
  - Source control and MNR as practicable options for sediments below area background

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